

IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF OKLAHOMA

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STATE OF OKLAHOMA, *et al.*, )

*Plaintiffs,* )

v. )

Case No. 4:05-cv-00329-GKF-PJC

TYSON FOODS, INC., *et al.*, )

*Defendants.* )

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ERRATA CORRECTING DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION  
TO PRECLUDE EXPERT TESTIMONY OF DEFENDANTS' WITNESS  
DR. CHARLES COWAN, Ph.D. (Dkt. No. 2072)

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Defendants respectfully submit this brief in opposition to Plaintiffs' motion to exclude the testimony of Dr. Charles Cowan. *See* State of Oklahoma's Motion in Limine to Preclude Expert Testimony of Defendants' Witness Dr. Charles Cowan, Ph.D., Dkt. No. 2072 (May 18, 2009). Plaintiffs' Motion proceeds from the premise that the laws of statistics somehow apply differently in environmental lawsuits than in any other field of study. Therefore, Plaintiffs argue, Dr. Cowan is unfit to evaluate Dr. Olsen's use of principal component analysis ("PCA"). But as Dr. Olsen admits, PCA is first and foremost a "multivariate statistical technique," Expert Report of Dr. Roger Olsen at 6-32 ("Olsen Rpt.") (Attached as Exhibit 1), and therefore squarely within Dr. Cowan's area of competence. Indeed, Dr. Olsen has already been compelled to amend his PCA analysis to correct a fatal flaw *identified by Dr. Cowan*. *See* Expert Report of Dr. Charles Cowan at 41 (attached as Exhibit 2) ("Cowan Rpt."); February 10, 2009 Declaration of Roger Olsen at 1-2 (attached as Exhibit 3). Far from demonstrating any special body of environmental statistics, Plaintiffs' Motion conflates substantive environmental inquiry with analysis of statistical rigor. Dr. Cowan has not purported to offer any opinion as to the sources or nature of any alleged contamination in the environment. Rather, his report examines the errors and confusion in Dr. Olsen's construction and execution of his sampling and principal component analysis. It is not Dr. Cowan who has strayed into Dr. Olsen's and Dr. Harwood's areas of expertise, but rather Drs. Olsen and Harwood who have stumbled into his. Dr. Cowan fairly and accurately critiques their statistical work, or lack thereof, and his testimony readily satisfies the *Daubert* standards for admissibility.<sup>1</sup>

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<sup>1</sup> Dr. Cowan's testimony is offered solely for the purpose of rebutting the PCA analysis put forward by Dr. Roger Olsen and the claims of "host specificity" put forward by Dr. Valerie Harwood. Defendants have moved to exclude each of those analyses. *See* Defendants' Motion to Exclude Dr. Roger Olsen's Principal Component Analysis Testimony Pursuant to *Daubert v. Merrell Pharmaceuticals*, Dkt. No. 2082 (May 18, 2009); Defendants' Motion to Exclude the

## LEGAL STANDARD

Federal Rule of Evidence 702 permits “a witness qualified as an expert by knowledge, skill, experience, training, or education” to testify regarding “scientific, technical, or other specialized knowledge [that will] assist the trier of fact to understand the evidence or to determine a fact in issue” so long as “(1) the testimony is based on sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.” *See* Fed. R. Evid. 702. Trial courts are charged with ensuring that expert testimony presented to the jury is both relevant and reliable. *See Attorney General of Oklahoma v. Tyson Foods, Inc.*, 565 F.3d 769, 779-781 (10th Cir. 2009); *Dodge v. Cotter Corp.*, 328 F.3d 1212, 1221 (10th Cir. 2003). The Court must first “determine if the expert’s proffered testimony has a reliable basis in the knowledge and experience of his or her discipline.” *Norris v. Baxter Healthcare Corp.*, 397 F.3d 878, 883-84 (10th Cir. 2005) (quotations, ellipses omitted). Then, the Court must determine whether the challenged experts’ reasoning and methodology is reliable. *See id.* at 884. If an expert’s testimony is grounded in the expert’s area of specialized knowledge, based on sound data and reliable methodology, and soundly applied to the facts of the case, the testimony should be admitted.

## DISCUSSION

Dr. Cowan is highly qualified to testify as to statistical analysis in general and PCA in particular in this case. Plaintiffs’ criticisms of Dr. Cowan’s analysis and proposed testimony flow from their misunderstanding or misrepresentation of his testimony. Indeed, far from

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Testimony of Dr. Valerie J. Harwood Pursuant to *Daubert v. Merrell Pharmaceuticals*, Dkt. No. 2030 (May 8, 2009). If the Court grants those motions, Defendants will not offer Dr. Cowan’s testimony and Plaintiffs’ motion as to his testimony will be moot.

misapplying Dr. Olsen's "protocols," Dr. Cowan's testimony demonstrates that Dr. Olsen's entire approach is inconsistent with sound practice.

**A. Dr. Cowan Is Highly Qualified To Proffer the Testimony He Proposes**

Dr. Cowan ranks among the nation's premiere statisticians, is highly qualified in his field, and has held top posts in both the public and private sectors. Dr. Cowan is currently the Managing Partner of Analytic Focus LLC. *See* Cowan Rpt. at 61. Dr. Cowan previously was a Director at Price Waterhouse, where he directed its Survey Research Center and its data mining group. *See id.* Before joining Price Waterhouse, Dr. Cowan was the Chief Statistician for the Federal Deposit Insurance Corporation and the Resolution Trust Corporation. *See id.* Dr. Cowan also previously served as Chief Statistician for the National Center for Education Statistics, and as Chief of the Survey Design Branch at the U.S. Census Bureau. *See id.* at 62.

Dr. Cowan holds BAs in English and economics from the University of Michigan, an MA in economics also from Michigan, and a Ph.D. in mathematical statistics from the George Washington University. *See id.* at 65. He has substantial experience teaching in his field and is currently an adjunct full professor of statistics at the University of Alabama—Birmingham in the School of Public Health. *See id.* at 61, 65. He has also held faculty and consulting positions in statistics with the George Washington University and Johns Hopkins University. *See id.* at 65. In addition, he is a member of and has been an officer with numerous relevant professional societies including the American Statistics Association and the American Association for Public Opinion Research. *See id.* He is widely published in the field of statistics, *see id.* at 66-68, and has served as an expert witness in numerous cases both for Plaintiffs and Defendants, *see id.* at 69-72. As a Ph.D. in mathematical statistics who practices and teaches in the field, Dr. Cowan is well versed in the use of principal component analysis. Dr. Cowan has applied PCA himself.

Cowan Depo. at 67:2-4, 68:2-69:2 (attached as Exhibit 4). Dr. Cowan has and currently does teach PCA. *See id.* at 67:5-68:4. And, Dr. Cowan is published in the field. *See id.* at 70:7-18.<sup>2</sup>

Plaintiffs do not dispute Dr. Cowan's qualifications as a statistician, nor do they even dispute his qualifications regarding principal component analysis. Rather, they base their objections on the assertion that "Dr. Cowan's experience in performing statistical analysis is limited to the *social sciences*." Mot. at 1 (emphasis in original); *id.* at 2 (arguing that Dr. Cowan's testimony "is based solely on his experience in statistics as applied in the *social sciences*") (emphasis in original). And, they claim, Dr. Cowan "has never performed an analysis involving the sources of contamination in an environmental case." *Id.* at 2. However, Plaintiffs' challenge is irrelevant, wrong, and based on a fundamental misunderstanding of Dr. Cowan's proposed testimony.

*First*, Plaintiffs asserted distinction lacks basis. Plaintiffs nowhere demonstrate that the rules of statistics somehow apply differently in environmental litigation than they do in any other field. Neither Dr. Olsen, nor any of their other retained consultants claims or demonstrates that a principal component analysis must be performed differently or functions differently on an environmental dataset than on any other dataset. Any such suggestion must fail. Indeed, in performing his PCA, Dr. Olsen employed a commonly used statistical software package called "SysStat." As Dr. Cowan explained at his deposition, "SysStat doesn't ask if [the data] is environmental. It just runs the program." Cowan Depo. at 72:16-24. SysStat simply takes the numbers plugged into it and performs the analysis; it does not care whether the numbers

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<sup>2</sup> Dr. Cowan's qualifications to opine regarding the use of principal component analysis stand in stark contrast to those of Dr. Olsen who has no formal training in statistics, has never been employed as a statistician, and has never taught or published any peer reviewed literature regarding the application of PCA to identify the source of an alleged environmental contaminant. *See P.I.T.* at 773:18-774:14 (attached as Exhibit 5); Olsen 9-11-08 Depo. 305:7-12, 306:2-8 (attached as Exhibit 6).

represent environmental samples, population data, or the distribution of chocolate candies.

Similarly, Dr. Cowan critiqued the number of samples Dr. Harwood used to make her claim that her “biomarker” was specific to poultry. *See* Cowan Rpt. at 52-60. Again, the analysis as to the statistical relevance of a given dataset has nothing to do with the nature of the dataset. The statistics are the same. *See, e.g.*, Cowan Depo. at 379:1-382:16, 396:15-397:14.

Plaintiffs’ principal evidence on this point is the opinion of Dr. Jim Loftis, a previously undisclosed expert consultant<sup>3</sup> who purports to have provided “peer review” for Dr. Olsen’s work.<sup>4</sup> Dr. Loftis notes that Colorado State University offers a “separate graduate course in environmental statistics.” Mot. Ex. D ¶7. He argues that application of statistics in environmental cases requires specialized understanding of the treatment of “laboratory non-detects,” the “application of the log-normal distribution to environmental data sets,” and “the common practice of averaging duplicate environmental analyses.” *Id.* Dr. Loftis posits that Dr. Cowan “has little experience with [these],” *id.*, and therefore must not be qualified to testify. But Plaintiffs misunderstand Dr. Cowan’s proposed testimony. Dr. Cowen does not take issue with the treatment of non-detects, the use of logarithms, or averaging of data *per se* but rather

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<sup>3</sup> Plaintiffs did not previously perform any sort of statistical analysis to support their experts’ work. Dr. Loftis’s testimony represents new expert opinion not disclosed consistent with the deadline for expert reports and in compliance with Rule 26(a)(2). *See Dura Automotive Sys. v. CTS Corp.*, 285 F.3d 609 (7th Cir. 2002) (striking affidavits from previously undisclosed experts offered in support of *Daubert* briefing); *Palmer v. ASARCO Inc.*, 2007 WL 2254343 (N.D. Olka. Aug. 3, 2007) (same). Defendant will move separately to strike Dr. Loftis’s declaration.

<sup>4</sup> Dr. Loftis’s use of the term “peer review” is, of course, quite different from the manner in which the term is used in *Daubert* and in this Court’s prior opinion discounting Dr. Harwood’s and Dr. Olsen’s testimony. *See* Opinion & Order, Dkt. No. 1765, at 7 (Sept. 29, 2008). Review by a retained consultant is hardly the independent confirmation of validity for which courts look. *See, e.g., Honaker v. Innova, Inc.*, 2007 U.S. Dist. LEXIS 30222, at \*6-7 (W.D. Ky. Apr. 23, 2007) (rejecting effort to resuscitate an expert’s testimony with the late-disclosed testimony of another expert); *Gaskin v. Sharp Elec. Corp.*, 2007 U.S. Dist. LEXIS 65532, at \*30 (N.D. Ind. Aug. 31, 2007) (rejecting as “untenable” plaintiffs’ argument that review by opposing experts constituted “peer review.”).



demonstrates the effect that these practices, when aggregated in the manner that Dr. Olsen did, have on the accuracy with which PCA can measure variability in a dataset. For example, as Dr. Cowan made clear at his deposition when Plaintiffs' first showed this misunderstanding, he never argues that non-detects should be treated as zero. *See* Cowan Depo. at 114:7-24.<sup>5</sup> Rather, his objection is that when treated logarithmically, the use of different values for non-detects for the same constituent destabilizes the variability of the sample set. *See* Cowan Rpt. at 32-33. So too, averaging the results of multiple tests on the same sample artificially reduces the actual, measured variability in the dataset. *See* Cowan Rpt. at 16-17. Dr. Loftis has nothing to say regarding Dr. Cowan's actual point, and nowhere suggests that the measurement of variability in a dataset by PCA somehow differs in environmental litigation.

Plaintiffs' other previously undisclosed expert witness, Dr. Rich Chappell,<sup>6</sup> similarly asserts that "one cannot evaluate the relevance and reliability of a statistical analysis without considering other scientific evidence, such as the evidence contained in the other IRW studies, which of course Dr. Cowan did not review or even consider." Mot. Ex. E ¶6. Therefore, he concludes, Dr. Cowan cannot opine on Dr. Olsen's work. *Id.* at ¶¶4-7. But Dr. Chappell's assertion is wrong on its face. The "relevance and reliability" of a statistical analysis can be tested either by examination of the math itself or by examination of the results as compared with

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<sup>5</sup> Plaintiffs' claim that Dr. Cowan "change[d] his opinion" at his deposition, Mot. at 4, is simply not true. At Dr. Cowan's deposition, when non-detect results first came up, Plaintiffs' counsel stated his understanding that "[s]o you suggest here on Page 26 that non-detects should be treated as zero." Dr. Cowan immediately pointed out that that "wouldn't be possible" and explained that "my criticism is that it's not that there ... is a value substituted for the non-detect; it's that the values vary for even the same analytes" which distorts analyses run on log-transformed data. Cowan Depo. at 114:7-24. Dr. Cowan did not change his opinion; he corrected Plaintiffs' counsel's misunderstanding of his opinion. *See* Cowan Rpt. at 26, 32-33.

<sup>6</sup> As explained below, Dr. Chappell actually performed some of Dr. Olsen's analysis, but has never before been disclosed as an expert witness or submitted any report. Defendant will move separately to strike Dr. Chappell's testimony. *See* n. 2, *supra*.

real-world data. Dr. Cowan does the first; Dr. Chappell's critique goes only to the second, which Dr. Cowan nowhere holds himself out as doing, or as qualified to do.

Plaintiffs take great issue with Dr. Cowan's observation that Dr. Olsen incorrectly uses the terms "variable" and "parameter" interchangeably. *See* Mot. at 3; Cowan Rpt. at 40; Olsen Rpt. at 6-53 (attached as Exhibit 6). The term parameter, they argue, is commonly used in the environmental sciences, including by USGS. Mot. at 3. But Dr. Cowan does not suggest otherwise. Cowan Depo. at 42:2-8. Rather, Dr. Cowan's point was that in statistical analysis these terms have specific and independent meanings, and should not be used interchangeably. Cowan Rpt. 40 n.16. The fact that the USGS uses one instead of the other is no refutation given that, as Dr. Cowan pointed out at his deposition, USGS does not appear to treat them as synonyms. Cowan Depo. at 42:9-43:11. Of course, even if environmental scientists do routinely use different terms than statisticians, so long as the concepts are consistent, that in no way undermines Dr. Cowan's mathematical critique of Dr. Olsen's work. Plaintiffs have not demonstrated otherwise.

None of these objections demonstrates that the mechanics of constructing a dataset or conducting a principal component analysis are any different in the environmental field than in any other field. Plaintiffs' claimed distinction lacks merit.

*Second*, Plaintiffs are in any event wrong that Dr. Cowan's experience is limited to the "social sciences." Quite the contrary, as Dr. Chappell acknowledges, Dr. Cowan does have experience working with environmental studies. *See* Mot. Ex. E. ¶ 5.<sup>7</sup> Dr. Cowan testified regarding numerous cases on which he worked that "involved groundwater or airborne

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<sup>7</sup> Dr. Chappell's peculiar aside that these cases were "not listed in [Dr. Cowan's] rebuttal report," Mot. Ex. 5 ¶5, is misinformed as counsel walked Dr. Cowan through cases listed in Appendix 3 to Dr. Cowan's report. *See* Cowan Depo. at 12:24-13:11.

contamination around a plant or ... some other type of facility that had some type of discharge.”

Cowan Depo. at 6:19-7:5. In those cases, Dr. Cowan critically reviewed the data and the statistics that were put forward, and used those tools to assess environmental impact. *See id.* at 8:8-9:17. Plaintiffs’ counsel questioned Dr. Cowan in detail and at length regarding his past experience in such cases. *See id.* at 9:18-27:16. Indeed, Dr. Cowan even has experience working on litigation regarding the tracking of the source and movement of bacteria. *See id.* at 30:6-31:13, 370:23-372:12. Apart from his litigation experience, Dr. Cowan routinely works with other experts on matters involving the “hard sciences.” He is currently working on a study tracking the spread of drug-resistant tuberculosis in prison populations in Peru. *See id.* at 32:12-33:18. He is also working currently on a project for the Centers for Disease Control and the Bill and Melinda Gates Foundation examining the spread of AIDS from mothers to infants in Africa. *See id.* at 33:20-35:9. And, as noted, Dr. Cowan is a professor at the University of Alabama in the School of Public Health. *See Cowan Rpt.* at 61. In fact, Dr. Cowan has often published on the use of statistics in the medical field.<sup>8</sup>

Separately, in preparation for his work on this case Dr. Cowan reviewed the literature governing the use of statistics in environmental work. He reviewed a book chapter written by

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<sup>8</sup> *See, e.g.,* Brock, David W., *et al.*, *Association between Physical Inactivity and Prevalence of Obesity in the United States*, Jnl. of Physical Activity and Health (January, 2009); Keith, Scott W., *et al.*, *Body Mass Index and Headache Among Women: Results From 11 Epidemiologic Datasets*, 16:2 Obesity at 377-383 (February 2008); Cowan & Wittes, *Intercept Studies, Clinical Trials, and Cluster Experiments: To Whom Can We Extrapolate?*, 15 Controlled Clinical Trials at 24-29 (1994); Sudman, *et al.*, *Sampling Rare and Elusive Populations*, 240 Science at 991-996 (May 20, 1988); Frey, *et al.*, *Representativeness of the Surveillance, Epidemiology, and End Results Program Data: Recent Trends in Mortality Rates*, Jnl. of the Nat’l Cancer Institute, Vol. 84, No. 11 (June 3, 1992); Charles Cowan, *Misclassification of Categorical Data*, Proceedings of the American Statistical Association, Section on Survey Research Methods (1985); Cowan & Malec, *Capture-Recapture Models When Both Sources Have Clustered Observations*, 81:394 Jnl. of the Am. Statistical Ass’n 347-53 (June 1986); Wei & Cowan, *Selection Bias*, Encyclopedia of Statistical Science, (1984).

Defendants' expert, Dr. Glenn Johnson, along with another text on the use of PCA in environmental studies. *See id.* at 74:3-7. He also consulted with Dr. Johnson, an environmental statistician, regarding some of the very points Plaintiffs claim are unique to that field. *See id.* at 96:10-97:10 (discussing "non-detect" results). He also reviewed published literature regarding the use of PCA in environmental studies. *See id.* at 74:7-17. Unsurprisingly, Dr. Cowan learned that PCA is applied in the environmental context in precisely the same manner as it is in any other context. *See id.* at 74:21-75:8.

*Third*, Plaintiffs' argument rests on a misrepresentation of the testimony Dr. Cowan proposes to tender. Plaintiffs argue that Dr. Cowan has never before "performed an analysis involving the sources of contamination in an environmental case," and therefore "lacks qualifications that are specific to the environmental issues he proposes to address as an expert." Mot. at 2, 8. But Dr. Cowan does not purport to perform any environmental analysis: he neither analyzes "sources of contamination" nor speaks to "environmental issues." Rather as he explained clearly at his deposition, his task was simply to assess the mechanics of Dr. Olsen's statistical methods.

Q. What are you doing in this case?

A. I'm evaluating the quality of the statistical analysis that was done by Dr. Olsen. I'm not doing a separate statistical analysis.

Cowan Depo. 8:3-6. Plaintiffs' counsel betrayed the same misunderstanding at Dr. Cowan's deposition and Dr. Cowan set him straight.

Q. Okay. So this would be your first case where you evaluated such a dataset as in this case?

A. Well, keep in mind, I didn't evaluate the dataset. I evaluated Dr. Olsen's work.

Cowan Depo. at 28:25-29:3.

A cursory review of Dr. Cowan's report confirms this characterization. He explains what PCA is, including the sort of relationships it draws, the manner in which it explains variability in a dataset, and the need for proper sampling. *See* Cowan Rpt. at 6-16. He then critiques Dr. Olsen's application of these statistical tools to the data Plaintiffs collected in this case. *See id.* at 16-51. He explains how Dr. Olsen's various methods for substituting data alter the variability in the overall dataset, the very thing that PCA is used to measure. *See id.* at 16-26. He explains the problems that can arise from combining potentially incompatible datasets without appropriate sensitivity testing. *See id.* at 26-28. He explains the distortion of the variability introduced by Dr. Olsen's use of logarithms with respect to non-detect results. *See id.* at 33. He explains how Dr. Olsen's methodology was poorly set forth, how his dataset is not reproducible from Plaintiffs' own data, and how his analysis violated his own posited ground rules. *See id.* at 35-51. And, he explains a critical error in Dr. Olsen's work that Dr. Olsen subsequently had to amend. *See id.* at 41-42.

None of these are unique to environmental litigation or constitute an environmental analysis. Dr. Cowan nowhere purports to evaluate the source of any particular constituent in the IRW. He does not question the methods by which samples were collected or tested. He does not claim to have identified or disproved any particular "signature." Nor does he address or evaluate Dr. Olsen's subjective derivations from his PCA analysis. Plaintiffs attack Dr. Cowan for having "no specific knowledge of the IRW" and for having "no concept or fundamental understanding of the nature of contaminant transport, either potentially within the IRW or in general." Mot. Ex. 5 ¶6.<sup>9</sup> But these are irrelevant to Dr. Cowan's analysis of Dr. Olsen's execution of his PCA.

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<sup>9</sup> While Dr. Chappell's criticism that Dr. Cowan has "no concept or fundamental understanding of the nature of contaminant transport, either potentially within the IRW or in general," Mot. Ex. 5 ¶6, has no bearing on Dr. Cowan's actual testimony, Defendants do appreciate Dr. Chappell's

Rather, they are relevant to the second, subjective portion of Dr. Olsen's analysis where he takes the results of his PCA and divines which samples correlate to which source. *See* P.I.T. at 839:4-9, 861:23-864:4, 897:21-898:4 (Dr. Olsen admitting that the PCA does not identify particular sources of constituents or determine relative contributions from any source, and that instead this analysis reflects his own subjective judgment."); *see also* Olsen *Daubert* Motion, Dkt. No. 2082, at 19-25 (Dr. Cowan's testimony relevant to criticism of Dr. Olsen's compilation of his dataset and execution of his PCA, not his subjective extrapolations therefrom). Criticism of that subjective analysis is handled by Dr. Glenn Johnson. *Id.* at 9-14. Dr. Cowan simply reviewed Dr. Olsen's application of a *statistical* model.

Similarly with regard to Dr. Harwood's analysis, Mot. at 3-4, Dr. Cowan does not purport to hold himself out as a microbiologist. *See* Cowan Depo. 73:10-19. He does not critique Dr. Harwood's execution of her PCR process. He does not claim, for example, that she incorrectly tested samples or confused different types of bacteria. The substantive critique of Dr. Harwood comes from Dr. Myoda. Dr. Cowan simply evaluates Dr. Harwood's failure to consider the laws of statistics in claiming that tests of a handful of samples were sufficient to declare her biomarker to be unique to poultry litter. *See* Cowan Rpt. at 52-60; Harwood *Daubert* Motion, Dkt. No. 2030, at 15-17 (Dr. Cowan's testimony relevant to Dr. Harwood's failure to perform any statistically meaningful analysis on account of small sample sizes).

All that Dr. Cowan has purported to do is to apply the statistical tools with which he is familiar to Plaintiffs' work, and critique their application of those same tools to their dataset. Dr. Cowan's testimony is well within his bailiwick, and should be permitted.

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testimony as to the importance of fate and transport analysis in actual environmental analysis. His testimony is well directed at Dr. Harwood and Dr. Olsen, each of whom failed entirely to perform any such analysis.

**B. Dr. Cowan's Criticisms of Dr. Olsen's Work Are Well-Founded and Based on an Appropriate Data-Set**

In an effort to bolster their claims that Dr. Cowan is not qualified to render statistical testimony in an environmental lawsuit, Plaintiffs allege various errors in his analysis.

Specifically, Plaintiffs make two interrelated allegations: that Dr. Cowan failed to follow Dr. Olsen's "protocols" in attempting to reproduce Dr. Olsen's dataset; and that because he was unable to, Dr. Cowan must have run his analysis on the wrong dataset. *See* Mot. at 8-9. Neither point is well taken. Far from undermining Dr. Cowan's qualifications, these discussions in fact confirm the shortcomings Defendants have pointed out in Dr. Olsen's work.

Taking Plaintiffs' arguments in reverse order, Plaintiffs are wrong that Dr. Cowan ever analyzed the wrong dataset. Dr. Cowan ran several analyses on Dr. Olsen's "SW3" data set, Dr. Olsen's principal surface water PCA run that supports his claim to have identified a unique poultry signature in the IRW. *See* Olsen Rpt. at 6-50. For example, Dr. Cowan ran a test to determine whether the data gathered for samples included in SW3 that had a full set of real-world measured data were compatible with the data gathered for those samples in SW3 that were missing measurements for some factors. *See* Cowan Rpt. at 20-22. Separately, Dr. Cowan ran an analysis to determine whether the data that Plaintiffs gathered themselves was compatible with the data gathered by the USGS. *See id.* at 26-28.

Plaintiffs argue that Dr. Cowan must have run these analyses on the wrong data set. *See* Mot. at 9 & Ex. E ¶11. Plaintiffs base this claim on Dr. Cowan's discussion of the difficulty he had in reproducing Dr. Olsen's dataset. *See* Cowan Rpt. at 18 ("Replication of Dr. Olsen's Analysis Dataset.... Basically, we can't."). Because Dr. Cowan argued that Dr. Olsen's SW3 database was not reproducible from Plaintiffs' original database by following Dr. Olsen's instructions, Plaintiffs assume that Dr. Cowan must have had the wrong dataset for his

subsequent analyses on SW3. *See* Mot. at 9 & Ex. E ¶11. Plaintiffs are wrong for the simple reason that Dr. Olsen separately produced his segregated SW3 dataset as part of his considered materials, both in Appendix F to his report and also in an Excel spreadsheet labeled “Crosstab\_Water\_0427\_SW\_3.xls”. *See* Cowan Decl ¶5 (attached as Exhibit 7).<sup>10</sup> Thus, Dr. Cowan had Dr. Olsen’s actual SW3 set for his analyses.<sup>11</sup>

Turning back to Plaintiffs’ first criticism, Dr. Cowan’s point was not that he could not reproduce Dr. Olsen’s dataset and therefore could not analyze it, but rather that Dr. Olsen’s dataset was poorly constructed and inconsistent with his own stated instructions for assembling it. Dr. Cowan had in his possession Plaintiffs’ master database in Microsoft Access (all 20 of them) as well as Dr. Olsen’s SW3 data set in Microsoft Excel. *See* Cowan Rpt. at 16, 35; Cowan Decl. at ¶5. Dr. Cowan’s analysis demonstrates simply that the data Dr. Olsen presents in the latter is often inconsistent with the data contained in the former. *See* Cowan Rpt. at 35-51.

Plaintiffs quibble with some, but not all of the errors that Dr. Cowan identifies. *See* Mot. at 8-9. For example, they castigate Dr. Cowan for incorrectly limiting his search to samples coded “SW:S” (*i.e.* surface water), thus failing to capture other relevant data records. *See* Mot. at 8 & Ex. E ¶8. But this argument is misleading in two respects. First, in Appendix F to his report, Dr. Olsen lists the sample groups that make up his SW3 dataset, each of which includes the SW:S label. *See* Olsen Rpt. Apx. F. It would therefore hardly be unreasonable for a competent scientist, whether or not an environmental statistician, to begin reconstructing the

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<sup>10</sup> Defendants include this declaration from Dr. Cowan to respond to new facts and analyses offered by Plaintiffs’ previously undisclosed expert testimony.

<sup>11</sup> Dr. Olsen’s considered materials also included excel files containing the PC scores resulting from his SW3 run (“Results\_Water\_0427\_SW\_3.xls”) and his “scatter plot” resulting from SW3 (“PC\_Plot\_Water\_0427\_SW\_3.xls”). *See* Cowan Decl. at ¶ 5. That Dr. Cowan analyzed the correct dataset is underscored by the fact that he was able to identify a critical error in Dr. Olsen’s manipulation of that set. *See supra* at 1.



dataset using the data to which Dr. Olsen's own report pointed. Second, as Dr. Cowan explained in his report, he only began with the records labeled SW:3, and then performed various other steps to recreate Dr. Olsen's dataset. *See* Cowan Rpt. at 35-36. Indeed, had he not, Dr. Cowan would not have found any of the USGS water data, which carried different sample labels. *See id.* Moreover, this begs the question why Dr. Olsen's dataset was so confusingly and disparately labeled. As Dr. Cowan explains, Dr. Olsen repeatedly changes sample names in a manner that frustrates the reproducibility of his work. *See* Cowan Rpt. at 36-38 (sample names changed, for example, due to averaging of multiple samples); Cowan Decl. ¶7. Plaintiffs attack Dr. Cowan's purported lack of familiarity with environmental statistics, but their own experts' testimony is similarly replete with instances of their confusion over Dr. Olsen's inconsistent sample labeling. *See, e.g.,* Macbeth Depo. at 256:22-257:18 ("So when Roger would submit a sample request to us, we would say, well, we don't have the samples. And it was because the sample IDs he was using were not the ones they had given us for those particular samples.") (attached as Exhibit 8); Harwood July Depo. at 157:4-10 ("Q. .... [D]o you know the sample naming? A. You know, I was actually always confused about that. I had to go and ask CDM every time I was looking at the samples, so I don't know.") (attached as Exhibit 9). Moreover, Plaintiffs offer only the equivocal testimony that an environmental scientist would have known that this "*could be* the result of mishandling of such split/replicate data." Mot. at 9 & Ex. E ¶8 (emphasis added).<sup>12</sup>

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<sup>12</sup> The same goes for Plaintiffs' discussion of phosphorous samples. Mot. at 9 & Ex. E. ¶ 9. Dr. Chappell reports that Dr. Olsen drew Total Phosphorous data from Plaintiffs' master dataset, but that Dr. Cowan simply failed to find it because he used a "parameter key code for [only] one of several analytical methods used in the IRW for this particular variable." *Id.* But Dr. Cowan did in fact follow the steps set out in Dr. Olsen's report, which nowhere identifies the alleged "parameter key code[s]" that Dr. Chappell now points to. *See* Olsen Rpt. at 6-39 to 6-49 (setting out alleged data-gathering procedures). Instead, Dr. Olsen simply refers generally to calculations performed by a program called "EDAnalyzer," *id.*, which he subsequently explained is proprietary software maintained by CDM, *see* Olsen 9-11-08 Depo. at 308:7-309:9. This begs

The fact that Plaintiffs mishandled their own data, and failed to identify properly all steps necessary to construct their key data set, is hardly a basis for striking Dr. Cowan's criticisms of that effort.<sup>13</sup>

Plaintiffs' consultant Dr. Chappell takes issue with several other aspects of Dr. Cowan's testimony, most notably Dr. Cowan's testimony regarding Dr. Olsen's use of averages to substitute in for missing test results.<sup>14</sup> He disputes that Dr. Olsen did so, arguing that he did not in fact substitute mean values in for missing data in his PCA. Mot. Ex. E ¶11. This merits two points in response. First, Plaintiffs' counsel raised this issue at Dr. Cowan's deposition, where he asked whether Dr. Olsen's results could be reached by using a function provided by SysStat called "Pairwise Deletion," which provides values for missing data so that a PCA analysis can be run. *See* Cowan Depo. 273:18-277:20. In response, Dr. Cowan demonstrated that using that function is the mathematical equivalent of substituting in the mean. *See id.* at 271:14-273:5, 278:8-281:25. Therefore, Dr. Cowan's characterization that Dr. Olsen substituted in the mean was accurate. Dr. Chappell offers no response to this explanation. *See* Mot. Ex. E ¶ 11.

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the question why Dr. Olsen was using phosphorous data gathered through different, and not necessarily compatible, analytical methods. *See* Cowan Rpt. at 26-28 (demonstrating that the USGS and CDM-collected datasets are not compatible, possibly because of differing collection or analytical methods).

<sup>13</sup> Plaintiffs criticize Dr. Cowan for not following "the specific protocols used by Dr. Olsen." Mot. at 9 & Ex. E ¶9. Indeed, Dr. Chappell claims that these "protocols" were "followed by Dr. Olsen and documented in detail." But Dr. Chappell fails to anywhere identify precisely what these protocols were, or where precisely they were documented. *See id.*

<sup>14</sup> Dr. Chappell discusses several data points that were coded in Plaintiffs' database as having been rejected and therefore not relied upon by Dr. Olsen in his analysis. *See* Mot. Ex. E ¶10. Plaintiffs do not elevate this criticism into their brief, no doubt recalling Dr. Olsen's use of rejected data in his own prior PCA runs. *See* P.I.T. at 828:12-830:1. Dr. Chappell argues that "[a]ny competent environmental scientist would have easily tracked it down and understood the root issue." Mot. Ex. E ¶10. If he is right as to Dr. Cowan, then surely the same must go for Dr. Olsen.

More interestingly, though, the Court may wonder how Dr. Chappell knows what Dr. Olsen did. Dr. Chappell asserts loudly that “mean values were NOT substituted for missing data.” *Id.* (capitals in original). Yet, he cites no document, conversation, or authority for this fact. Nor did Plaintiffs’ counsel produce any such proof at Dr. Cowan’s deposition; rather, he simply represented for the record that this was the case. *See Cowan Depo.* at 280:15-281:21. In fact, as Dr. Cowan explained, Dr. Olsen nowhere documented how he performed this calculation, leaving Defendants’ experts to guess as best they may. *See id.* at 282:1-8.

The reason that Dr. Chappell knows what Dr. Olsen did, is because he in fact performed many of these analyses. Dr. Chappell wrote large portions of Dr. Olsen’s PCA report. *See Olsen 9-11-08 Depo.* at 23:8-26:20. As Dr. Olsen admits, it was Dr. Chappell who “had the expertise in the programs to run the statistical analysis.” *Id.* at 300:22-301:5. It was he, not Dr. Olsen, who actually ran SysStat and generated every PCA run produced in support of Dr. Olsen’s report. *Id.* at 301:6-15. In fact, Dr. Chappell wrote the proprietary software that sets up Dr. Olsen’s PCA runs. *Id.* at 308:7-309:9. Dr. Chappell’s declaration has less to do with applying *Daubert* to Dr. Cowan’s testimony as it does with shoring up Dr. Olsen’s testimony. To the extent Plaintiffs wish to rely on Dr. Chappell’s work directly—he provides no other basis for how he knows the things he asserts—he should have been disclosed as an expert witness so that Defendants’ experts could have considered his testimony. *See Fed. R. Civ. P.* 26(a)(2) (requiring written and timely disclosures of all expert testimony upon which a party may rely); *Dura Automotive Sys. v. CTS Corp.*, 285 F.3d 609 (7th Cir. 2002) (striking affidavits from previously undisclosed experts offered in support of *Daubert* briefing); *Palmer v. ASARCO Inc.*, 2007 WL 2254343, at \*\*2-5 (N.D. Okla. Aug. 3, 2007) (excluding affidavit attached to opposition to

*Daubert* motion that supplied new analyses and previously undisclosed opinions); *see also* Cowan Decl. at ¶4.

At bottom, even if Plaintiffs have explanations for some of the inconsistencies that Dr. Cowan identifies in Dr. Olsen's data collection and compilation, they certainly cannot explain them all. Indeed, Plaintiffs have no response to the fact that the data presented in Plaintiffs' main database and SW3 data set are quite simply, and without explanation, different. Dr. Cowan walks through two of many examples in his attached declaration. *See* Cowan Decl. at ¶¶8-13. The fact is that Dr. Olsen created a substantial portion of the data in his PCA runs, which, as Dr. Cowan explains, alters the variability in the dataset and biases the results towards Dr. Olsen's conclusions. The fact that the difficulties in recreating Dr. Olsen's work were caused in the first instance by Dr. Olsen's own sloppy data management, is certainly no basis to exclude Dr. Cowan's testimony.

### CONCLUSION

Dr. Cowan's testimony lies well within his area of technical expertise, and is supported by reliable data and sound methodologies. It is therefore admissible under *Daubert*.

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